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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Application of:

ROXY NI FAN ET AL.

CASE NO.: IM1300 US NA

APPLICATION NO.: 10/085,262

GROUP ART UNIT: 1752

FILED: FEBRUARY 27, 2002

EXAMINER: RICHARD L. SCHILLING

CONFIRMATION NO.: 1704

FOR: A PROCESS FOR MAKING A
FLEXOGRAPHIC PRINTING PLATE AND A
PHOTOSENSITIVE ELEMENT FOR USE IN
THE PROCESS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Declaration Pursuant to 37 CFR §1.131

I, ADRIAN LUNGU, declare that:

1. I have been employed at the Parlin, New Jersey Research & Development Laboratory of E. I. du Pont de Nemours and Company since August 1997. I currently hold the position of Senior Research Chemist which I attained in August 1999.

2. I am a co-inventor of the subject matter claimed in the above-identified patent application.

3. Prior to June 2000, I, along with my co-inventors Roxy Fan, Mark Hackler, Anandkumar Kannurpatti, and Bradley Taylor, conceived the present invention of a process for making a flexographic printing plate.

4. Prior to June 2000, I reduced to practice the present invention of a process for making a flexographic printing plate wherein a photosensitive printing element includes a thermally removable layer that is an actinic radiation opaque layer comprising (i) at least one infrared absorbing material, (ii) a radiation opaque material, wherein (i) and (ii) can be the same or different, and at least one binder having a softening or melting temperature less than 190 °C.

5. On or about June 9, 1999 in the Parlin laboratory, I thermally developed a photosensitive printing element having an actinic radiation opaque layer as follows.

A photosensitive printing element was prepared which had a photopolymerizable layer on a support and an actinic radiation opaque layer on a side of the photopolymerizable layer opposite the support. The photopolymerizable layer included an elastomeric binder, at least one monomer, a photoinitiator and other additives. The actinic radiation opaque layer included 33% by weight, carbon black as an infrared absorbing material and a radiation opaque material, and 67% by weight, Macromelt® 6900 polyamide as a binder, based upon the total weight of the layer.

The photopolymerizable layer was imagewise exposed to actinic radiation to form polymerized portions and unpolymerized portions as follows. The actinic radiation opaque layer was laser ablated with infrared laser radiation to selectively remove the opaque layer and form a mask on the photopolymerizable layer. The photopolymerizable layer was overall exposed to ultraviolet radiation at 354nm through the mask.

The exposed printing element was thermally treated in an experimental thermal processor substantially as described as the first embodiment of U.S. Patent 5,279,697 (copy attached). The exposed printing element was placed on a heated drum, and contacted with a non-woven absorbent web that was supported with a hot roller. The drum operated at 130°F (54.4°C) and the hot roller operated at 275°F (135°C). The experimental thermal processor also included an infrared radiant heater positioned to direct heat to an outermost surface of the exposed printing element. The infrared heater was set at 3 Volts which corresponded to a temperature of about 275 °F (135°C). The exposed printing element was heated and contacted with the absorbent material 6 times to remove the unpolymerized portions and form a relief of about 16 mils.

The actinic radiation opaque layer was removed after the first pass; that is, the portions of the actinic radiation opaque layer that formed the mask were thermally removed after the first cycle of heating and contacting with the absorbent web.

The specific experimental example used in performing this process is described in my Laboratory Notebook E93364, page 47, dated June 9, 1999, a copy of which is attached hereto. The photosensitive printing element described above is identified in my notebook as LAMS capped plates.

The attached copy of the Material Safety Data Sheet, Section 9, for the Macromelt® 6900 polyamide indicates a melting or softening temperature of 130 -150 °C. Thus, the binder in the actinic radiation opaque layer has a softening or melting temperature less than 190 °C as recited in the present invention.

6. I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the

United States code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

03/25/04
Date

Alungu
Adrian Lungu
Post Office Address:
623 Marlboro Road
Old Bridge, New Jersey 08857
United States of America

TITLE

FAST

DATE

06/04/99

PURPOSE

Nerv 2105

- Digital

E 93364- 47

Also, LAMS capped plates were laser ablated and exposed. The smaller plates (18x7) were developed very well and nice.

Both LAMS and NCL cap were removed after the first pass.

Regular conditions (6 passes, roll temp. -130 F, non-woven roll temp. 275, IR voltage 3V) cleaned only 16 mils.

By increasing the temperature of the nonwoven to 290 F and 8 passes, 18-20 mils were obtained.

Increasing the pressure to 60 psi above all previous conditions, 22-23 mils relief was obtained.

By increasing the number of passes to 12, 26-28 mils relief were achieved.

Having smaller plates (digital ones) only 7 passes were enough to get 25-27 mils relief when the pressure was increased from 20 psi to 40 psi.

Ideal conditions for 22x21" target: 12 sec. backflash, 18 min. main exposure, 10 passes, 60 psi pressure, 4.5 V IR heaters, 130 F base plate, 285 F top plate.

EXPERIMENTER

Almogu

DATE

06/04/99

WITNESSED BY

J. L. L.

DATE

9-29-99

MACROMELT 6900, DATA SHEET

Revised: 01/01/2000

Supercedes 11/02/1998

PRODUCT NAME MACROMELT 6900

CASRN. 68154-60-9

MANUFACTURER Cognis Corporation

Cincinnati, OH 45224

Phone 800-543-7370

Fax: 513-482-5515

EMERGENCY NUMBER:

This product does not contain any hazardous chemicals as defined by the
OSHA Hazard Communication Standard (29 CFR 1910.1200)

SECTION 3: HAZARDS IDENTIFICATION

***** Emergency *****
***** Overview *****

procedures when handling near flammable or explosive materials
Molten resins will cause burns

SOLID, DICED, WATER WHITE PARTICLE

SKIN CONTACT:

May cause skin irritation upon prolonged or repeated exposure. Molten

EYE CONTACT:

No adverse health effects are known.

May cause diarrhea or depressed activity if taken in large amounts

OTHER HEALTH EFFECTS:

No carcinogenicity, mutagenicity or teratogenicity effects are known. No effects of chronic exposure or target organ effects are known. No

PRIMARY ROUTES of EXPOSURE Skin

SECTION 4. FIRST AID MEASURES

Flush with plenty of water. Consult a physician if irritation develops.

Flush with plenty of water. Consult a physician if symptoms develop.

Move to fresh air. If symptoms persist, consult a physician.

Flash Point Not Applicable

RECOMMENDED EXTINGUISHING MEDIA

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE OR EXPLOSION HAZARDS:
None Known

None Known to Henkel

STEPS TO TAKE IN CASE OF SPILL OR LEAK

Pick up spilled material and containerize Vacuum area or flush with

SECTION 7 HANDLING AND STORAGE

Static electricity may be generated when handling. Use proper grounding

Molten resin may cause severe burns. If skin/eye contact occurs,

help for removal

SKIN PROTECTION:

RESPIRATORY PROTECTION:

Not applicable with local exhaust.

ENGINEERING CONTROLS

Local exhaust

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: SOLID, DICED, WATER WHITE PARTICLE

ODOR SLIGHT RESINOUS

MELTING POINT 130-150 Deg C

BOILING POINT N/D Deg C

PERCENT VOLATILES (by Wt) 0 at 70 Deg F

VAPOR DENSITY Not Determined

VOC CONTENT (EPA Method 24) Not Determined

VOC CONTENT (EPA Method 24) 0.0 %

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Normally Stable

INCOMPATIBLE MATERIALS:

None Known

CONDITIONS TO AVOID:

HAZARDOUS DECOMPOSITION PRODUCTS

Not Determined

SECTION 11 TOXICOLOGICAL INFORMATION

TYPE OF STUDY	RESULTS	SPECIES
EYE IRRITATION	10 (Scale 0-110)	Rabbit

ECOLOGICAL TOXICITY

ENVIRONMENTAL FATE

Not Determined

SECTION 13. DISPOSAL CONSIDERATIONS

This product, if disposed as shipped, is not a hazardous waste as specified in 40 CFR 261. Dispose of in an approved landfill in

SECTION 14. TRANSPORTATION INFORMATION

PROPER SHIPPING NAME Not regulated for nonbulk highway transportation
IM/NA N/A

DOT HAZARDOUS MATERIALS:

Not Applicable

HAZARDOUS MATERIALS: Not Applicable

SECTION 15 REGULATORY INFORMATION

1500 INVENTORY STATUS

This product and/or all of its components are included on the TSCA Inventory of Chemical Substances.

TSCA 12(b) COMPONENTS:

SARA 311/312 HAZARD CATEGORIES:

None

CERCLA HAZARDOUS SUBSTANCES:

CALIFORNIA PROPOSITION 65 COMPONENTS

None

SECTION 16: OTHER INFORMATION

THIS RATING IS BASED ON FLAMMABILITY, REACTIVITY, AND

OTHER DATA. IF A HAZARD IS IDENTIFIED, IT WILL BE LISTED HERE.

THE FOLLOWING WARNING INFORMATION IS PROVIDED ON THE LABEL FOR THIS PRODUCT.

Static electricity may be generated when handling. Use proper grounding procedures when handling near flammable or explosive materials.

May cause diarrhea if swallowed.

CHRONIC EFFECTS:

Move to fresh air. If symptoms persist, consult a Physician.

FIRST AID - EYE CONTACT

develops

FIRST AID - EYE CONTACT

If swallowed, get medical attention

UNUSUAL FIRE OR EXPLOSION HAZARDS

SPECIAL FIRE FIGHTING PROCEDURES:

None Known

water to remove residues

HANDLING AND STORAGE

Static electricity may be generated when handling. Use proper grounding or bonding procedures when handling near flammable or explosive materials.

Immediately cool with cold water. Do not remove resin. See Material Safety Data Sheet for removal.

ABBREVIATIONS USED

NE or N/E = Not Established

N/AP = Not Applicable

All information, recommendations, and suggestions appearing herein concerning our product are based upon tests and data believed to be

correct, complete, and applicable, for the use of the product described herein. Since the actual use by others is beyond our control, no guarantee, express or implied, is made by Cognis

safety and toxicity of the product nor does Cognis Corporation assume any liability arising out of use, by others, of the product referred to

when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations

Cognis Corporation

Cincinnati, OH 45232-1419